

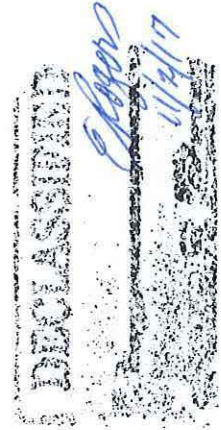


Geismar, LLC

January 29, 2016

Delivered via: Certified Mail
E-mail

Carlos B. Flores
U.S. EPA Region 6
Compliance and Enforcement Division
Air Branch / Toxics Enforcement Section
Mail Code: 6 EN-AT
1445 Ross Avenue Suite 1200
Dallas, TX 75202-2733
(214) 665-7113
flores.carlos@epa.gov



Re: National Response Center Follow-up

Dear Mr. Flores:

The following information is provided in response to your e-mail requesting information about the incident that occurred on September 3, 2015.

1. Provide the name, title, email, phone number and mailing address for the person to whom formal correspondence should be sent regarding the release.

Troy Harris, EHS Coordinator
Phone: (225) 744-1316
36187 Highway 30
Geismar, LA 70734

2. Who owns and/or operates the location where the event occurred?

REG Geismar, LLC
36187 Highway 30
Geismar, LA 70734

3. Briefly describe the facility, e.g. discuss what activities take place on-site and what substances are produced, processed, handled or stored on-site.

The facility converts animal fats and greases to produce renewable diesel fuel, naphtha and LPG. Feed stocks arrive by rail car and tanker truck, and products are distributed to customers by tank truck. The facility employs approximately 70 persons on average and is operated 24 hours per day, 7 days per week.



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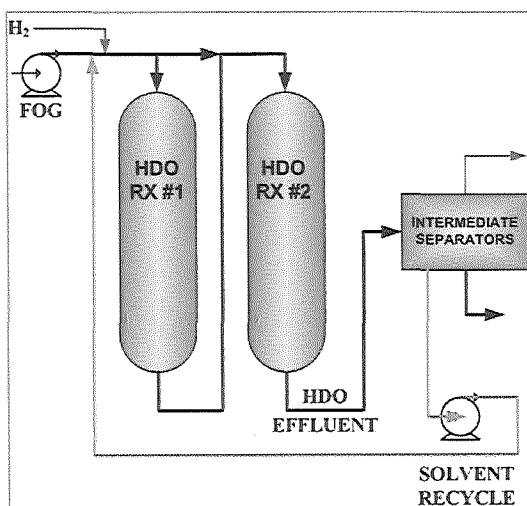
The plant is divided into four major process sections: Feed Pretreating, Process, Products, and Utilities. The event occurred in the Process section of the facility.

Supporting infrastructure consists of a tank farm, loading terminal, railcar and tank truck off-loading area, control room, cooling tower, hot oil furnace, warehouse, and offices.

4. What process units for equipment were involved in the event? Provide a brief description and process flow diagram for the processes involved.

The plant is divided into four major process sections: Feed Pretreating, Process, Products, and Utilities. The event occurred in the Process section of the facility. Supporting infrastructure consists of a tank farm, loading terminal, railcar and tank truck off-loading area, control room, cooling tower, hot oil furnace, warehouse, and offices.

Operation of the Hydrodeoxygenation (HDO) recycle pump is necessary for production of renewable hydrocarbon diesel. The HDO recycle pump is a multi-stage 200 HP centrifugal pump that circulates renewable diesel blend stock from the hot separator back to the HDO reactors. The purpose of recirculation is to maintain process temperature control in the HDO reactors. The operating pressure and temperature of the HDO recycle pump is 450 degrees F and 1950 psig respectively.



5. At the time of the incident, was the facility operating under a Title V Air Permit?

The facility does not operate under a Title V permit. The facility operates under a minor source air permit.

6. What is the SIC or NAICS code for the facility where the event occurred?

SIC 2869: Organic Chemical Manufacturing

NAICS code 325199 – All other basic organic chemical manufacturing.

7. Did the event take place at a Risk Management covered process?

Yes. The facility has a Risk Management Program.

8. Provide a detailed description and timeline of the event. Include the best known start time and duration of the incident and the timeline for any emergency response.

On Thursday September 3, 2015, REG operations personnel and Excel project contractors were in the process of changing valve bonnet gaskets on a series of ¾ inch manual valves (gate and globe) in the HDO process area when a hydrogen release and subsequent fire occurred. An REG process operator and three Excel contract personnel incurred burns. All four were transported to a local hospital for treatment. The process unit was not in operation or start-up.

The hydrogen release and fire occurred at approximately 11:47pm. Prompt action was taken to establish water flow and fire suppression with local fire monitors. Industrial emergency services entered the facility, positioned equipment, and established fire suppression by 1:00am. At approximately 2:30, operations personnel were able to enter the area to close valves and establish nitrogen purge to equipment. At 5:19am an all clear notification was completed.

9. What specific substances were released during the event, including the estimated or known amounts of each substance? Include all air contaminants that were released during the event, even those materials with release amounts below the reportable quantity.

Emissions consisted of combustion of hydrogen at release locations and depressurization to the flare.

10. Have there been any investigations or audits of the event? Are investigations or audits pending? Who performed the investigations or audits? Provide a copy of the reports, audits, or any other analysis describing the causes and consequences of the event, including all draft reports and/or draft audit results.

A formal investigation was initiated immediately following the event. The investigation is still in progress and not yet complete.

11. What is the initial best known cause or root cause of the event? Were there any additional contributing factors that you are aware of?

See responses to #8 and #10 above.

12. What measures have been taken to address the findings, conclusions or recommendations of the investigations or audits?

See response to #10 above.

13. Are there any findings, conclusions, or recommendations that have not been addressed fully, and if so, what measures remain to be taken, and what is the expected timeline for implementing those measures?

See response to #10 above. Any and all recommendations will be formulated and implemented based upon the formal investigative findings.

14. Were there any fatalities or injuries attributed to this event? If yes, please explain.

There were no fatalities attributed to this event. An REG Process Operator and three Excel mechanical contractors incurred burns.

15. Did you, or anyone else, issue any evacuation, road closure, or shelter-in-place orders as a result of the event for your facility or surrounding community? If yes, explain.

An evacuation of the facility occurred as a result of the event. One adjacent manufacturing facility conducted a shelter in place. No other shelter in place order was issued for the facility or surrounding community.

16. Was there any property or equipment damage, both on-site and/or off-site, that resulted from the event? If yes, explain.

Damage occurred in the process area of the plant including piping, instrumentation, utilities (electric, steam, etc...) and insulation.

17. What emergency response measures were taken, by you or anyone else, to stop and/or to minimize hazards from the event?

Emergency response measures were initiated by REG personnel to establish water flow and fire suppression from fixed fire monitors. Industrial Emergency Services entered the facility, positioned equipment, and established fire suppression until the fuel source was isolated and fire extinguished.

18. Did you or anyone else the facility perform any air monitoring during or after the event, including any routine monitoring? If so, then please provide a summary of the results.

Air monitoring was conducted during the event by REG personnel. Attached are the monitoring results:

19. Identify and provide copies of any industry standards, internal standards, SOPs, or manufacturer's recommendations related to the incident including equipment, process units, and personnel activities involved in the incident.

At the time of the incident maintenance activities were being performed to repair valves that were identified as leaking during pressure testing earlier in the shift. Attached is a copy of the Geismar Isolation of Energy Source – Lockout/Tagout procedure.

20. Please provide any documents associated with the identification of hazards at your facility related to the incident.

Attached are safety data sheets (SDS) identifying hazards associated with Renewable Hydrocarbon Diesel (RHD) and Hydrogen.

21. Has any local, state, or federal agency conducted an investigation or requested information regarding the event? If so, please provide the name and contact information for each agency person who conducted an inspection or requested information.

OSHA is in the process of conducting an investigation. Contact information:

Chris Herrington, Assistance Area Director

9100 Bluebonnet Centre Blvd.

Suite 201

Baton Rouge, LA 70809

Phone: 225-298-5458 Ext.108

herrington.chris@dol.gov

By: Michael Byrd - REG Operator

[illegible]



Isolation of Energy Source Lockout – Tagout

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POLICY

All sources of hazardous energy will be controlled prior to performing servicing and maintenance on machines or equipment and prior to opening lines or vessels.

1. SCOPE

- 1.1 This standard applies to all REG GEISMAR LLC employees and other personnel working at the Geismar Facility.
- 1.2 The standard establishes minimum performance requirements for the isolation and control of hazardous energy by affixing appropriate lockout–tagout devices.
- 1.3 These procedures apply to all forms of energy including, but not limited to electrical, steam, pneumatic, hydraulic, mechanical, thermal, chemical, pressure and gravity.
- 1.4 This procedure **does not** apply to the following:
 - 1.4.1 Work on cord and plug connected electrical equipment for which exposure to the hazards of unexpected energization or start-up of equipment is controlled by the unplugging of equipment from the energy source AND the plug is under the exclusive control of the employee performing the maintenance or service.
 - 1.4.2 Hot tap operations involving transmission and distribution systems for substances such as gas, steam, water, or petroleum when they are performed on pressurized pipelines, provided that:
 - Continuity of service is essential;
 - Shutdown of the system is impractical; AND
 - Documented procedures are followed (Hot Tapping Procedures), and special equipment is used which will provide proven effective protection for employees.
 - 1.4.3 Operations where the controlled release of potentially hazardous energy sources is intended (e.g., sandblasting, piping blow down).



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2. PURPOSE

This standard establishes procedures and training to prevent personnel injury and equipment damage from the unexpected energization, start-up or release of stored energy. This standard is intended to comply with the requirements of 29 CFR 1910.147, Control of Hazardous Energy and establishes the minimum requirements for the isolation of all energy sources during maintenance or servicing of equipment and machinery and for line breaking or vessel opening operations.

3. REFERENCES

- 3.1 Code of Federal Regulations Title 29, Part 1910.147, *The Control of Hazardous Energy (Lockout / Tagout)*.
- 3.2 American Petroleum Institute (API) API Standard 590 – Steel Line Blanks
- 3.3 National Fire Protection Association (NFPA) *NFPA Vol. # 70E, Standard for Electrical Safety Requirements for Employee Workplaces*
- 3.4 Lockout / Tagout Isolation Log Form – 02-SAF-0121
- 3.5 Lockout / Tagout Periodic / Annual Inspection – 02-SAF-0122
- 3.6 Lockout / Tagout Isolation Verification Form – 02-SAF-0123
- 3.7 Safe Work Permitting Standard – 02-SAF-0100

4. DEFINITIONS

- 4.1 Affected Employee - An employee whose job involves the operation or use of a machine or equipment on which servicing or maintenance is being performed under lockout/tagout or whose job requires work in an area where such servicing or maintenance is being performed.



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- 4.2 Authorized Employee - A person who isolates machines or equipment and implements a lockout/tagout procedure to perform servicing or maintenance. An authorized employee must understand the necessary precautions to be taken and possess the expertise to properly isolate the equipment or system. An authorized employee and an affected employee may be the same person when the affected employee's duties also include maintenance or service work on a machine or equipment that must be locked and/or tagged out.
- 4.3 Blanking or Blinding - The absolute closure of a pipe, line or duct by the fastening of a solid plate (such as a blind flange, spectacle or a skillet blind) that completely covers the bore and is designed to withstand the maximum pressure of the pipe, line or duct with no leakage beyond the plate.
- 4.3.1 High Pressure (> 100 psig.) or high temperature (> 120° F) service requires a double block and bleed isolation for cold work activities.
- 4.3.2 Cold work requires a double block and bleed configuration (or blind) for isolation.
- 4.4 Double Block and Bleed - The closure of a line, duct or pipe by closing and locking and/or tagging two in-line valves and by opening and locking and/or tagging a drain or vent valve in the line between the two closed valves.
- 4.5 Energy Isolation Device - A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a slide gate; a blind; a line valve; a block; and any similar device used to block or isolate energy. The term does not include a push button, selector switch or other control circuit type devices.
- 4.6 Energy Source - Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal or other energy. Common types of energy include:
- 4.6.1 **Mechanical Energy** can be linear translation or rotation, or it can produce work, which in turn produces changes in temperature and pressure. This type of energy can be controlled by switching on or off.



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- 4.6.2 **Potential Energy** can be due to pressure (above or below atmospheric) as in hydraulic, pneumatic or vacuum systems, or it can be due to springs or gravity. Potential energy can be dissipated, controlled or blocked; it cannot be turned on or off.
- 4.6.3 **Electrical Energy** refers to generated electrical power or static electricity. In the case of generated electricity, the electrical power can be turned off or the path from the source to the destination can be interrupted and capacitor charges dissipated. Static electricity can only be dissipated or controlled.
- 4.6.4 **Thermal Energy** is manifested by high or low temperature. This type of energy is the result of mechanical work, radiation, chemical reaction or electrical resistance. It is controlled by isolating the source of the temperature differential.
- 4.7 Equipment Lock – A lock used to secure an individual energy isolation or lockout device.
- 4.8 Job Lock – A lock used to ensure the continuity of energy isolation during multi-shift operation. A job-lock is typically placed on a lockbox. The key to the job-lock is controlled by the Task Supervisor/Operator from each shift. A job-lock is an additional (optional) lock and is not a substitute for applying personal locks. The job-lock is not a substitute for the Task Supervisor/Operator's personal lock.
- 4.9 Keyed Alike Locks – A group of locks consisting of two or more locks that are keyed alike and have a common key (master key). Keyed alike locks may be equipment locks or personal locks. In either case, ONLY one key is available for keyed alike locks and must be under the exclusive control of the individual or located inside a lockbox during group lockout/tagout procedures.
- 4.10 Line Breaking - Act of separating piping, lines or ducts that would allow the contents or residual contents of the pipe, line or duct to be exposed to the atmosphere.



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- 4.11 Lockbox – A device used to secure the keys to the locks on isolation devices during a group lockout to which each authorized employee affixes his/her personal lock.
- 4.12 Lockout Device - A key lock or hasp/key lock combination to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.
- 4.13 Operations Lock/Long Term Lock – A lock used in a facility for security or operational control and is not to be used as an energy isolation lock for lockout/tagout purposes. Operations locks can be any size, shape or color and **MUST** be different than locks used for lockout/tagout purposes.
- 4.14 Personal Lock – An employee's uniquely keyed lock placed on a lockbox or isolation device(s) by the individual for personal protection from hazardous energy.
- 4.15 Person-In-Charge (PIC) – The lead REG GEISMAR Representative on-site who has the overall responsibility for a facility, project, work crew or work area.
- 4.16 Tagout Device - A prominent warning device, such as a tag and a means of attachment, (e.g., nylon cable tie) which can be securely fastened to an energy isolating device in accordance with the established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed. Tagout devices shall be designed to withstand the environment to which they are exposed, and the attachment means (e.g., nylon cable tie) shall be self-locking, non-releasable with a minimum unlocking strength no less than 50 pounds to prevent removal without the use of excessive force. See Standardized Lockout / Tagout Tag in Exhibits).
- 4.17 Task Supervisor/Lead Operator - A person designated by the Supervisor or Person-In-Charge (PIC) to lead or coordinate the work to be performed. For the purpose of this standard, the Task Supervisor/Lead Operator must be an "authorized employee."

5. RESPONSIBILITIES

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- 5.1 All REG GEISMAR Facility Personnel shall be responsible for:
- 5.1.1 Being aware of work performed in their areas and whether they are affected employees as defined by this HSE standard.
- 5.2 Affected Employees shall be responsible for:
- 5.2.1 Being familiar with the lockout/tagout, line breaking and vessel opening procedures and recognize all lock/tag and blind devices;
- 5.2.2 Applying personal locks and tags when involved in the servicing of machines or equipment (if also an authorized employee).
- 5.3 Authorized Employees shall be responsible for:
- 5.3.1 Being trained and knowledgeable in all aspects of the Lockout/Tagout Procedure;
- 5.3.2 Understanding the necessary precautions to be taken,
- 5.3.3 Possessing the expertise to properly isolate the machine and equipment.
- 5.3.4 Applying personal locks and tags when involved in the servicing of machines or equipment.
- 5.4 Task Supervisor/Lead Operators shall be responsible for:
- 5.4.1 Coordination of the maintenance and/or servicing work;
- 5.4.2 Ensuring that all personnel working on the job are aware of their responsibilities;
- 5.4.3 Selecting the authorized employee to lockout and tagout equipment and machinery for servicing or maintenance.
- 5.4.4 Reviewing equipment isolation and Lockout/Tagout procedures before work proceeds;
- 5.4.5 Ensures authorized employees place personal locks and tags on each locking device or lockbox when involved in the servicing or maintenance of equipment or machinery.
- 5.4.6 Controlling the key to the job-lock on each shift.
- 5.5 Person-In-Charge shall be responsible for:
- 5.5.1 Ensuring all employees are trained and adhere to Lockout/Tagout Procedures;



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- 5.5.2 Ensuring contractors are properly informed of REG GEISMAR LO/TO procedures and adhere to established LO/TO procedures.
- 5.6 REG GEISMAR Supervisors shall be responsible for:
- 5.6.1 Ensuring all employees are trained and adhere to Lockout/Tagout Procedures;
- 5.6.2 Ensuring contract personnel adhere to the Lockout/Tagout Procedures;
- 5.6.3 Ensuring that inspections of lockout/tagout procedures are performed and documented by an “authorized employee” and any deficiencies addressed and corrected;
- 5.6.4 Ensuring all newly installed, renovated, and/or modified equipment is capable of being locked out.
- 5.7 Contractor Employees shall be responsible for:
- 5.7.1 Being aware of work performed in their areas and whether they are affected employees, authorized employees, Task Supervisor/Lead Operators or a PIC.
- 5.7.2 Must follow all lockout/tagout procedures and comply with this standard.
- 5.8 Contractor Management shall be responsible for:
- 5.8.1 Implementing lockout/tagout procedures, which meet all federal and state regulations and provides at least the same level of protection to all employees as the REG GEISMAR Corporation procedure;
- 5.8.2 Ensuring all contractor personnel are adequately trained on the procedure;
- 5.8.3 Ensuring that the lockout/tagout procedure to be used for each job is decided upon by both the contractor and the REG GEISMAR Task Supervisor/Operator prior to the start of the job;
- 5.8.4 Ensuring all employees, (REG GEISMAR and contractor) are instructed on the specific requirements of the procedure to be used at the pre-job safety meeting;



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- 5.8.5 Ensuring that all contractor personnel have their own personal lock(s) and tag(s) in use. (The contractor and REG GEISMAR personnel can use the same isolation procedures and equipment locks);
- 5.8.6 Ensuring the lockout/tagout procedures and isolation devices are reviewed and thoroughly understood by contractor personnel before work begins. This is critical for extended jobs, where new contractor personnel arrive and leave at different times.



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6. TRAINING

- 6.1 Initial and annual training must be provided for all employees who may work in areas where energy control procedures may be utilized.
- 6.2 Retraining shall be provided for all employees whenever there is a change in job assignments that affect their duties, a change in machines or processes that present a new hazard, or a change in the energy control procedures.
- 6.3 Retraining shall be provided whenever an inspection reveals that there are inadequacies in the employee's knowledge or use of these procedures.
- 6.4 The Facility must maintain records that employee training has been accomplished and is being kept up-to-date. The records shall contain each employee's name and the date(s) of training.

7. DOCUMENTATION

<u>Record</u>	<u>Location</u>	<u>Retention</u>
Periodic Inspection Reports	Facility	36 Months
Annual Inspection Reports	Facility	36 Months
Isolation Logs	Facility	36 Months
Equipment Isolation Procedures	Facility	12 Months after revised, superseded, or obsolete
Employee Training Records	Facility	36 Months after separation



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8. LOCKOUT PROCEDURE

- 8.1 ALL energy isolating devices, which are capable of being locked out, will be locked out using a key-type lock. Tags will **NOT** be used for isolations in lieu of a lock **ANYWHERE** that a lock could be used.
- 8.2 Whenever a major replacement, repair, renovation or modification of machines or equipment is performed and whenever new machines or equipment are installed, the energy isolating devices for the equipment or machines shall be designed to accept a lockout device.
- 8.3 Only "authorized employees" shall perform lockouts.
- 8.4 The Person-In-Charge of a facility shall determine the employees, who by virtue of their training or experience, are "authorized employees". The PIC shall determine which equipment/systems each authorized employee is qualified to isolate and lockout and designate a Task Supervisor/Operator for each project.
- 8.5 All locks used for lockout purposes (ie; equipment locks, personal locks and job locks) must be standardized within a facility in at least one of the following criteria: color, shape or size. All personal locks must have a unique key, which remains in the possession of the individual at all times.
- 8.6 All locks used for lockout purposes (ie; equipment locks, personal locks and job locks) must be singularly identified (i.e., have a serial number, name, etc., to distinguish it from all other locks), and **MUST NOT** be used for any other purpose.
- 8.7 All locks must be accompanied by a tag identifying the employee that applied it, the date the lock was applied, and the purpose for the lockout. Tags shall be standardized by print and format and clearly identified as part of the lockout/tagout standard.
- NOTE:** See Standardized Lockout /Tagout Tag.
- 8.8 The key to each lock may be unique to that lock or may be common to a group of locks ("keyed alike locks"). In either case, ALL key(s) to each unique lock or ALL common (master) keys to a group of keyed alike locks MUST be under the **sole control** of the authorized employee who applied the lock or in a lockbox, while the lock is in place. (See "Application of Group Lockout/Tagout Procedure").



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- 8.9 All personnel in the workgroup will apply a personal lock and tag to each lockout device (i.e., multi-lock hasp) of the equipment being locked out or to the lockbox being utilized. Personal locks will have a means of identifying the owner of the lock (i.e., a metal name tag, name stamped on lock or accompanied by an identification tag).

9. TAGOUT PROCEDURE

- 9.1 A tagout system may be used ONLY when an energy-isolating device is not capable of being locked out.
- Tags will **NOT** be used for isolations in lieu of a lock **ANYWHERE** that a lock can be used.
 - Tags are essentially warning devices affixed to energy isolating devices and do not provide the physical restraint on devices that can be provided by a lock and chain.
- 9.2 Additional safety measures should be considered when a tag is used without a lock. Examples include the removal of an isolating circuit element, blocking of a controlling switch, opening of an extra disconnecting device, or the removal of a valve handle to reduce the likelihood of inadvertent energization.
- 9.3 The tag must be placed directly on the energy-isolating device.
- 9.4 Only “authorized employees” shall perform tagouts.
- 9.5 All tags used for tagout purposes must be standardized with one of the following criteria: color, shape or size. Print and format must be standardized.
- 9.6 All tags used for tagout purposes must be singularly identified and **MUST NOT** be used for any other purposes.
- 9.7 All tags must be capable of withstanding the environment to which they are exposed for the maximum period of time that exposure is expected. Tagout devices must be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.



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9.8 Tagout devices, including their means of attachment (e.g., nylon cable tie) must be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means must be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

9.9 Tagout devices must warn against hazardous conditions if the machine or equipment is energized and must include a clearly written legend such as the following: Do Not Start; Do Not Open; Do Not Close; Do Not Energize; Do Not Operate, etc.

9.10 Preparation for Shutdown

9.10.1 Prior to turning off any equipment for the purpose of lockout/tagout, the Task Supervisor/Operator and appropriate maintenance personnel should:

- Determine the types and amounts of energy powering the equipment. More than one energy source (electrical, mechanical, etc.) may be involved.
- Locate and identify all isolating devices and the steps needed to control them.

9.11 Equipment Shutdown

9.11.1 Notify all affected employees on shift and in the immediate area, either by personal contact, radio or phone.

9.11.2 Use the normal shutdown procedures to stop the machine or equipment.

9.11.3 Locate all devices that control the flow of energy to the equipment and use them to isolate the equipment from its energy sources. This could mean closing a valve, installing a blind, shutting off the main power at the panel circuit breaker, etc.

NOTE: *Avoid shutting off the panel circuit breaker while a piece of equipment is under load; this could cause an electrical arc or an explosion.*



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9.12 Application of Individual Lockout/Tagout Devices

- 9.12.1 A Task Supervisor/Lead Operator may be designated and shall be responsible for ensuring all affected personnel adhere to this procedure.
- 9.12.2 The Task Supervisor/Lead Operator or designee will attach a multiple lockout hasp, a lock and tag to each energy-isolating device. Each additional employee who is required to work on the piece of equipment will also attach a personal lock and tag with the date the tag was applied and the purpose of the lockout/tagout.
- 9.12.3 Some energy sources may not have built-in lockout devices (e.g., some types of valves). Chain can be used to hold the valves in the correct position and the lock can be applied to the chain. There are also special types of devices available that fit over some types of valves and other energy isolating devices that can be locked out. A tag must be filled out and attached to each lock.
- 9.12.4 If after careful evaluation a lock cannot be applied, then ALL members of the work party must attach a tag to the energy isolating device at the same point that a lock would be applied, or as close to it as possible or implement group lockout procedures (see "Application of Group Lockout/Tagout Procedure"). Extra safety precautions are required if only a tag will be used (see "Tagout Procedure").
- 9.12.5 If bolted blank flanges (i.e., "blind flanges") or slip blinds (i.e., "skillet" blinds) are used for energy isolation, the Task Supervisor/Operator and ALL members of the work party must attach a tag to the flange, the same as for other energy isolating devices or implement group lockout procedures (see "Application of Group Lockout/Tagout Procedure"). **Blind flanges and skillet blinds must be designed to withstand the maximum pressure of the pipe, line or duct with no leakage beyond the plate when isolating other than atmospheric pressure (See Attachment A.7.1 "API Standard 590 – Steel Line Blanks").**



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9.12.6 Employees involved in the servicing and/or maintenance of equipment or machinery should attach personal locks and tags prior to beginning work and remove them when their portion of the work is complete or whenever they leave the job site. If the job is incomplete, arrangements will be made to keep the equipment secured to prevent unauthorized start up.

9.12.7 Proceed to Section 10.5 "Control of Stored Energy".

9.13 Application of Group Lockout/Tagout Procedure

9.13.1 A Task Supervisor/Lead Operator will be designated and shall be responsible for ensuring all affected personnel adhere to this procedure.

9.13.2 The Task Supervisor/Operator may determine that the implementation of a group lock box or comparable mechanism that will provide a level of protection equivalent to that of the individual lockout/tagout device procedure.

9.13.3 The following steps are an example of a group lockout procedure:

- The equipment is locked out by the Task Supervisor/Lead Operator or designee with equipment locks and tags. The key to each lock may be unique to that lock or may be common to a group of locks.
- ALL keys to ALL of the equipment locks are placed inside a lockbox.
- The Task Supervisor/Lead Operator attaches a personal lock and tag to the hasp.
- All other authorized employees attach their personal lock and tag to the hasp on the lockbox and maintain sole possession of their key.
- Additionally hasps can be added as necessary to accommodate all personal locks.

NOTE: For energy isolation devices that are not secured with a lock (i.e., blind flanges, spectacle or slip blinds etc.), either a tear-off two part tag with matching numbers or a equipment lock and tag will be attached to the isolation device. The key to the lock or the tear-off portion of the tag will be placed in the lockbox.



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9.14 Control of Stored Energy

- 9.14.1 Verify that all parts in the system have stopped moving.
- 9.14.2 Check the system for any potentially hazardous energy, which may still be stored.
- 9.14.3 Bleed off any trapped pressure that could release a hazardous material or operate a moving part.
- 9.14.4 A qualified person shall install ground wires, where necessary, to discharge electrically stored capacitors and prevent static electricity build-up.
- 9.14.5 Release the tension on all springs and other sources of potential energy using approved methods. If it is not possible to release the energy, then block and secure the source.
- 9.14.6 Block or support any elevated equipment or moving parts that could fall because of gravity (i.e., counter-weights).
- 9.14.7 Block and secure any parts in a hydraulic or pneumatic system, which could move from a loss of pressure. Drain the lines and leave vent valves open.
- 9.14.8 Drain piping on process systems and close valves to prevent the flow of hazardous materials.



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9.14.9 When piping systems and process vessels must be blocked where there are no valves, the lines may be blanked and blinded at the pipe flanges. Before separating the pipe flanges to insert a blind, ensure that the line or vessel to be worked on is completely depressurized and the liquid level inside the vessel is below the level of the piping. Record installation and removal of flanges on the Lockout/Tagout Isolation Log (See Section 10.7 "Isolation Log Form").

9.14.10 If there is a possibility of re-accumulation of stored energy to a hazardous level (i.e., leaking valves, etc.), verification of isolation must be continued until the servicing or maintenance is complete, or until the possibility of such accumulation no longer exists.

9.15 Verification of Equipment Isolation

9.15.1 Ensure that the equipment or machine is completely isolated. Review all previous steps to make sure they are complete. It is recommended the Lockout/Tagout Isolation Verification Log form be utilized.

- Ensure that all personnel are clear of equipment or machine.
- Push all start buttons and other operating controls to ensure that the equipment is isolated and will not start.
- Return all operating controls and switches to the "off" position and secure locks/tags.
- Open additional bleed valves to check for trapped pressure.

9.16 Isolation Log Form

9.16.1 A Lockout /Tagout Isolation Log form shall be kept for work involving non-routine isolations, work involving more than one person using multiple locks, the use of a lockbox or work involving multiple shifts. This log form will assist in keeping track of equipment which is locked out, its location and the authorized employee responsible for the isolation.

9.16.2 Isolation log form should be kept at the job site and always up-to-date. If the work activity requires the use of a Safe Work Permit, then the log form shall be kept with the work permit.



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9.17 Removal of Lockout/Tagout

- 9.17.1 After the servicing and/or maintenance on the machine or equipment has been completed, an inspection of the work area must be performed to ensure that all tools and nonessential items have been removed and that all machinery or equipment components are operationally intact.
- 9.17.2 The work area shall be checked to ensure that all affected employees in the area have been notified and cleared to a safe distance from the equipment before the locks and/or tags are removed.
- 9.17.3 Each lockout/tagout device must be removed from each energy-isolating device by the employee who applied the device except for emergency situations (See "Emergency Lockout / Tagout Removal").
- 9.17.4 For group lockout/tagout, each energy isolation device not secured by a lock, (i.e., blind flanges, spectacle or slip blinds etc.) will **ONLY** be removed when the work is complete and the appropriate key or numbered tear-off portion of the tag is removed from the lockbox and appropriately matched to lock or two part tag on the isolation device. (See Note under Application of Group Lockout/Tagout Procedure)
- 9.17.5 The Task Supervisor/Operator's personal lock and/or tag will be the last to be removed.
- 9.17.6 Review the isolation log to ensure that locks and tags have been removed and the equipment is in the correct position prior to startup.

10. SPECIAL CIRCUMSTANCES

10.1 Shift Change Requirements

- 10.1.1 The Task Supervisor/Lead Operator going off shift is responsible for briefing the Task Supervisor/Operator on the next shift. The arriving Task Supervisor/Lead Operator is responsible for briefing all of the other arriving personnel on the status of the job.



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- 10.1.2 Both Task Supervisor/Lead Operators, when possible, should tour the job site together and the arriving Task Supervisor/Lead Operator should place a personal lock and/or tag on each energy isolating device or lockbox prior to the removal of the departing Task Supervisor/Lead Operator's lock(s).
- 10.1.3 The arriving Task Supervisor/Lead Operator will place their lock and tag on the lockbox and the leaving Task Supervisor/Lead Operator will remove their lock and tag. If individually keyed unassigned locks are used, the tag may be placed on the lock by the arriving Task Supervisor/Lead Operator and the key to the lock (and therefore sole possession) turned over to him.
- 10.1.4 Other authorized employees shall replace/remove their locks and/or tags as they arrive or depart. Arriving employees should be briefed by the arriving Task Supervisor/Lead Operator concerning the status and details of the work.

10.2 Testing or Positioning of Machines

- 10.2.1 In situations where the lockout/tagout devices must be temporarily removed from the energy isolating device to energize the machine or equipment for testing or repositioning, the following sequence of actions shall be followed:
- Clear the machine or equipment area of tools and materials and notify the Task Supervisor/Operator of intent to remove LO/TO devices.
 - Clear all personnel from the machine or equipment areas.
 - Have authorized employees remove personal locks and tags.
 - Remove the lockout and/or tagout devices.
 - Energize and proceed with testing or repositioning.
 - If job is complete, refer to "Removal of Lockout / Tagout".
 - If job is not complete, de-energize all systems and re-apply energy control measures prior to continuing with the servicing and/or maintenance of the equipment.



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10.3 Emergency Lock/Tag Removal

- 10.3.1 Lockout and/or tagout devices must be removed from the energy-isolating device by the individual who applied them except under emergency conditions. When the authorized person who applied the device is not available to remove it, that device may be removed under the direction of the Person-In-Charge or designee provided that the following provisions are met:
- Verification that the authorized employee who applied the device is not at the facility and will not be able to return to remove the lock/tag prior to the equipment being returned to service.
 - A reasonable effort must be made to contact the authorized employee to inform the employee that the lockout and/or tagout device needs to be removed before the employee returns to work at the facility.
 - The Person-In-Charge will inspect the area and determine if any conditions exist which would not allow removal of the lockout and/or tagout device before it is removed.

10.4 Isolation for Confined Space Entry

- 10.4.1 Isolation requirements for entry into a confined space are detailed in REG GEISMAR "Confined Space Entry Standard".
- 10.4.2 In general, all piping and tubing leading into or out of the space must be properly isolated from the space by at least one or a combination of the following: physically disconnecting, installation of blinds, and/or have double block and bleeds. Blinding or disconnection of each line is required for all lines or piping potentially containing hazardous materials.



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10.4.3 If double block and bleed is used for piping with non-hazardous contents, the block valves must be locked and/or tagged closed and the bleed valves must be locked and/or tagged open, with the provision made for indication that depressurization between the block valves has been achieved. The bleed valve shall remain open and vented to a safe location. Remember high Pressure (> 100 psig.) or high temperature (> 120° F) service requires a double block and bleed isolation for cold work activities.

10.5 Isolation for Hot Work

10.5.1 Hot work procedures are detailed in REG GEISMAR "Hot Work Standard."

10.5.2 In general, where equipment or production system isolation is necessary to conduct hot work, the isolation will consist of one or a combination of the following: physical disconnect, installation of blinds and/or double block and bleed valves (where permitted, e.g. water lines).

10.6 Isolation for Cold Work

10.6.1 The degree of isolation for cold work often may be a single isolation device (i.e., valves, switches, etc.). However, the integrity of the isolation device must be confirmed before it can be used for isolation.

10.6.2 Before work is performed downstream of a single isolation device, consideration should be given to surrounding operations and the environment (e.g., vibration, temperature, hazardous operations, work duration, etc.) and the effects they may have on the single isolation device. These conditions may require a greater degree of isolation and additional precautions should be taken.

10.7 Electrical Isolations

10.7.1 The extent of electrical isolation required to ensure that the equipment is safe to work on will depend on the circumstances of each job.



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- 10.7.2 Electrical switches and controls may be isolated by an authorized employee to allow work on mechanical equipment or machinery. Work on electrical systems will be conducted by a “qualified person.”
- 10.7.3 Following isolation, electrical circuits shall be determined to be de-energized by using appropriate testing equipment and/or operating push buttons, switches, etc. (See section on “Verification of Equipment Isolation”).
- 10.7.4 NFPA 70E, “Standard for Electrical Requirements for Employee Workplaces” will take precedence when electrical work is being performed.

10.8 Isolation of Fire Protection Systems

- 10.8.1 The Person-In-Charge shall be notified prior to the isolation of any fire protection detection system or firewater piping.
- 10.8.2 The insurance company should be notified prior to bringing down the system and their procedures should be followed.
- 10.8.3 Smoke and fire detection devices should be disabled and tagged in the immediate area where hot work will be performed if it is probable that the work will activate the devices. All personnel should be made aware of how to manually operate the fire suppression system if it becomes necessary to activate it while the detectors are out of service. The detection devices should be returned to service immediately upon completion of the hot work.
- 10.8.4 If hot work must be performed in an area where a fire suppression system is out of service (fire water, halon system, etc.), extra precautions must be taken. Such precautions may include extra fire extinguishers and/or additional standby personnel. Precautions will vary depending on the size and duration of the job. Performing hot work while fire suppression systems are out of service should be avoided if possible.

10.9 Isolation of Safety Devices



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- 10.9.1 Safety devices shall not be bypassed or blocked out of service unless they are temporarily out of service for startup, maintenance, or testing procedures. The Person-In-Charge shall approve any such isolation.
- 10.9.2 An observer must continually monitor all process parameters affected by the isolation until the safety device is returned to service or until alternate protective measures are implemented. Any safety device which is temporarily out-of-service shall be properly tagged as such.

10.10 Long-Term Isolation

- 10.10.1 Equipment that has been isolated or secured for purposes other than undergoing maintenance or repair should be locked out with a "Long Term Locks/Operations Lock". These locks can be any size, shape or color, but must be different from lockout/tagout locks and NOT used for lockout/tagout purposes.
- 10.10.2 Long Term Locks/Operations locks should be accompanied by a tag that clearly indicates the status of the equipment and the danger of removing the device (i.e., Do Not Open, Downstream Equipment Not In Use). Tags should be signed and dated, and should be reviewed periodically to ensure they are still legible and in good condition.
- 10.10.3 Long Term Locks/Operations locks should not be removed without obtaining permission from the Shift Supervisor or Lead Operator.
- 10.10.4 Lockout/tagout devices and procedures shall be used if maintenance activities are performed on the equipment or machinery.

11. PRE-JOB PLANNING

- 11.1 Pre-job planning is essential for ensuring the safe performance of all work activities. The attachments to this Standard include some tools to assist in pre-job planning.
- 11.2 A "Lockout/Tagout Isolation Log" Form is a tool, which can be utilized for non-routine work, or work with increased risk to ensure the adequacy of the lockout/tagout procedures being implemented. The procedure allows for review



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and approval of the energy isolation procedures by an “authorized employee” and/or Task Supervisor/Lead Operator.

- 11.3 A “Long Term Lock Isolation Log” Form serves as a log of isolation points and identifies the types of energy sources isolated, means of isolation, reason for isolation. This log form should be utilized as a tool for isolating equipment or systems that will be abandoned, down for some time where work will not be performed.

12. INSPECTIONS

12.1 Periodic / Annual Inspections

- 12.1.1 At least annually, the Person-In-Charge will designate an “authorized employee” to conduct an inspection of each facility to ensure that the requirements of this procedure are being followed.
- 12.1.2 A periodic inspection should be conducted by a trained and knowledgeable “authorized employee” other than the one(s) utilizing the energy control procedure being inspected.
- 12.1.3 The periodic inspection should be used to identify and correct any deviations or inadequacies observed.
- 12.1.4 The inspections should be documented on the checklists and kept on file at the site for three years. The inspection findings should be reported to the Person-In-Charge.
- 12.1.5 The Person-In-Charge will review the inspection reports and ensure corrective action is taken to address any deficiencies noted.



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Fax (225) 673-6235

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Isolation of Energy Source Lockout - Tagout

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A. ATTACHMENTS**A.1 Exhibits****A.1.1 Standardized Lockout /Tagout Tags**

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EXHIBIT A.1.1

STANDARDIZED LOCKOUT / TAGOUT TAGS

Below are diagrams of the standardized tags for lockout / tagout in REG GEISMAR operations. All areas within REG GEISMAR utilize standardized tags for identifying energy isolation devices and personal locks during lockout / tagout procedures.



DANGER

DO NOT OPERATE

NAME _____

DATE _____

TAG/LOCK/KEY # _____

USE THIS TAG AND NO OTHER FOR
LOCKOUT. DO NOT USE FOR ANY OTHER
PURPOSE

LOCKOUT TAG



DANGER

**DO NOT REMOVE
THIS TAG**

Describe Equipment and Reason
for Lockout _____

OBSERVE PLANT LOCKOUT PROCEDURE

LOCKOUT TAG



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EXHIBIT A.1.1

STANDARDIZED LOCKOUT / TAGOUT TAGS (continued)



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Section 1 – Chemical Product and Company Identification

Product identifier: REG - 9000™ / RHD

Other means of identification

Synonyms: Renewable Hydrocarbon Diesel, RHD, Renewable Diesel, Renewable Synthetic Diesel Fuel, Dynamic Fuels™, Renewable Diesel Fuel, Bio-Synfining™ Diesel, Bio-Derived Diesel, Biomass-Based Diesel, Diesel Fuel No. 2, R98.9 Diesel Fuel, odorless mineral spirits

Recommended use: Fuel for use in compression ignition engines, in other combustion applications, a solvent, or an industrial blendstock

Restrictions on use: Not intended for direct human consumption

Supplier information: REG Marketing & Logistics Group, LLC
416 S. Bell Ave
Ames, IA 50010
(888) 734-8686

Emergency phone number: Chemtrec: (800) 424-9300

Section 2 – Hazard(s) Identification

Classification (in accordance with 29 CFR 1910.1200)

Hazard Class	Hazard Category	Route of Exposure
Aspiration Hazard	Category 1	Ingestion then aspiration
Flammable Liquid	Category 3	Ignition Source
Skin Irritation	Category 2	Absorption / Dermal Contact
Eye Irritation	Category 2A	Absorption / Eye Contact

Signal word: DANGER

Pictograms:



Hazard Statements: May be fatal if swallowed and enters airways
Flammable liquid and vapor
Causes skin and serious eye irritation
Repeated contact may cause skin dryness or cracking

Hazards not otherwise specified: Static Accumulator (50 picosiemens or less). This product can accumulate static charge by flow or agitation, and a static discharge could cause this product to ignite.

Precautionary statements

Prevention: Wear appropriate protective gloves, protective garments, and eye protection. Avoid breathing mists and sprays. Wash all affected skin thoroughly after handling.

Keep container tightly closed. Keep away from heat, sparks, open flames, hot surfaces, and other potential ignition sources. Ground / bond container and receiving equipment and take precautionary measures against static discharge – including the use of non-sparking tools and explosion-proof equipment.



Safety Data Sheet (SDS)

ID: SDS 400-US

Response: Do NOT induce vomiting. If swallowed: Immediately call a poison control center or physician.
Take off contaminated clothing immediately and wash it before reuse. If on skin, wash thoroughly with soap and water. If skin irritation or rash occurs, get medical advice.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists: Get medical attention.
In case of fire, use dry chemical or foam extinguisher – NOT water stream

Storage: Store in a tightly closed container in a cool well-ventilated area.

Disposal: Dispose of contents/container in accordance with local, state, and federal regulations.

Section 3 – Composition / Information on Ingredients

Basic components: This product is a complex combination of hydrocarbons obtained by the hydrodeoxygenation and catalytic hydroisomerization of animal fats and vegetable oils followed by distillative fractionation. It consists mostly of branched and linear paraffins having carbon numbers ranging from C₉ to C₁₈.

Chemical Name	Common Name & Synonyms	CAS number	% of product
Fuels, diesel, C9-18-alkane branched & linear	Renewable Hydrocarbon Diesel, RHD, Renewable Diesel	1159170-26-9	98 – 100%
Ultra low sulfur diesel	ULSD	68476-30-2	2%

Section 4 – First Aid Measures

First aid measures for exposure

Inhalation: If breathing difficulties develop, move victim away from source of exposure and into fresh air. Seek medical attention.

Eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If irritation persists: Get medical attention.

Skin: Take off contaminated clothing immediately and wash it before reuse. If on skin, wash thoroughly with soap and water. If skin irritation or rash occurs, get medical advice.

Ingestion: Aspiration Hazard: Do NOT induce vomiting. If swallowed: Immediately call a poison control center or physician.

Most important symptoms / effects

Acute: Aspiration into the lungs can cause fatal chemical pneumonitis. If ingestion has occurred, assume there is a risk of aspiration into the lungs – especially if nausea or irritation occurs.

Delayed / Chronic: Repeated exposure may cause dryness and cracking of the skin.

Indication of immediate medical attention and special treatment needed, if necessary: Aspiration into the lungs can cause fatal chemical pneumonitis. Treat symptomatically and supportively.

Section 5 – Fire Fighting Measures

Suitable extinguishing media:	Firefighting foam, dry chemical, carbon dioxide, or other clean extinguishing agents (such as Halon or Halotron). Water mist may be effective for extinguishing soaked oily materials if applied by experienced fire-fighting personnel.
Unsuitable extinguishing media:	Do not use a solid water stream, as it may scatter and spread the fire
Specific hazards arising from the chemical:	Static accumulator (50 picosiemens or less), unless performance additive has been added to mitigate static accumulation. This product can accumulate static charge by flow or agitation, and a static discharge could cause this product to ignite. This product can be ignited by heat, sparks, flames, or other sources of ignition (e.g., static electricity, pilot lights, or mechanical/electrical equipment). Heated liquid can release vapors that may readily form flammable mixtures at or above its flash point. If container is not properly cooled, it can rupture in the heat of a fire.
Hazardous combustion products include:	Carbon monoxide, carbon dioxide, nitrogen oxides, and hydrocarbons
Protective equipment and precautions for firefighters:	Incipient stage fires may be controlled with a portable fire extinguisher. For fires beyond the incipient stage, evacuate all unnecessary personnel. Emergency responders in the immediate area should wear standard firefighting protective equipment, including self-contained breathing apparatus (SCBA) and full bunker gear. In case of external fires in proximity to storage containers, use water spray to keep containers cool, if it can be done safely. Prevent runoff from entering streams, sewers, storm drains, or drinking water supply.

Section 6 – Accidental Release Measures

Personal precautions, protective equipment, and emergency procedures:	Keep all sources of ignition away from spill / release. The use of explosion-proof equipment is recommended. Wear protective garments, impervious oil resistant boots, protective nitrile gloves, and safety glasses. If product has been heated, wear appropriate thermal and chemical protective equipment. If splash is a risk, wear splash resistant goggles and face shield. Shut off source of spill, if safe to do so. Contain spill to the smallest area possible. Isolate immediate hazard area and remove all nonessential personnel. Prevent spilled product from entering streams, sewers, storm drains, unauthorized treatment drainage systems, and natural waterways. Place dikes far ahead of the spill for later recovery and disposal. Immediate cleanup of any spill is recommended. If material spills into or upon any navigable waters and causes a film or sheen on the surface of the water, immediately notify the National Response Center at 1-800-424-8802.
Methods for containment and clean-up	
Small spill / incidental release:	Small spills can be cleaned up with absorbent inert media (oil dri, sand, or earth), or absorbent pads. Use soapy water or degreaser to remove oily residue from the affected area, then rinse area with water. Place saturated materials in an appropriate oily waste container (metal can with a metal lid or an enclosed oily waste dumpster), and dispose of according to local, state, and federal regulations.
Large spill / release:	A spill remediation contractor with oil booms and skimmers may be needed for larger spills or spills that come into contact with a waterway or sensitive wetland. Recover as much product as possible by pumping it into totes or similar intermediate containers. Remove any remaining product with absorbent inert media (oil dri, sand, or earth), or absorbent pads. Use soapy water or degreaser to remove oily residue from the affected area, then rinse area with water. Place saturated materials in an appropriate oily waste container (metal can with a metal lid or an enclosed oily waste dumpster), and dispose of according to local, state, and federal regulations.



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Other information:

Materials saturated with this product, such as oily rags, used oil dri, soaked insulation pads, etc., may spontaneously combust due to product decomposition in the presence of oxygen. Place all such materials into appropriate oily waste containers (such as metal cans with metal lids or oily waste dumpsters with lids), and dispose of according to local, state, and federal regulations.

Section 7 – Handling and Storage

Precautions for safe handling:

Open container slowly to relieve any pressure. When transferring product, use pipes, hoses, and tanks that are electrically bonded and grounded to prevent the accumulation of static electricity. This product can accumulate static charge by flow or agitation, and a static discharge could cause ignition. Use explosion-proof electrical equipment (ventilation, lights, material handling, etc...). Wash thoroughly after handling and before eating, drinking or using toilet facilities. Do not wear contaminated clothing or shoes. Keep contaminated clothing away from sources of ignition such as sparks or open flames.

“Empty” containers can retain residue that may be ignitable. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks or other sources of ignition. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations.

Conditions for safe storage, including incompatibilities:

Use and store this material in cool, dry, well ventilated areas away from all sources of ignition. Storage tanks should have an appropriate ventilation and pressure relief system. Store only in approved containers, and keep them tightly closed. Keep away from strong oxidizing agents, strong reducing agents, strong acids, and strong bases. Open containers should be carefully resealed and kept upright to avoid leakage. Protect the container against physical damage.

Section 8 – Exposure Controls / Personal Protection

Precautions for safe handling

Component exposure limits:

Name	CAS #	ACGIH Exposure Limit	OSHA PEL	Form	Weight %
Fuels, diesel, C ₉₋₁₈	1159170-26-9	None	None	Liquid, Vapor or Aerosol	98-100%
ULS Diesel	68476-30-2	100 mg/m ³ TWA	None	Vapor & Aerosol	<2%

Appropriate engineering controls:

Keep product enclosed in primary containment (hoses, pipes, tanks, etc.) to avoid contact with skin. Handle in accordance with good industrial hygiene and safety practices.

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Use sealed systems as far as possible. Adequate ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Eye washes and showers should be available for emergency use. Firewater monitors and deluge systems are recommended. Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that

Safety Data Sheet (SDS)

ID: SDS 400-US

cannot be cleaned. Practice good housekeeping. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation. Do not ingest. If swallowed then seek immediate medical assistance.

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal protective equipment

Eyes / face:

Chemical splash goggles are recommended. However, if a local risk assessment determines that chemical splash goggles may not be required, safety glasses should be selected to provide adequate eye protection. If splash potential exists, add the use of a face shield.

Skin:

Wear disposable nitrile gloves for incidental contact. For more substantial contact, wear thicker nitrile or other similar oil-resistant gloves. Wear protective garments, such as a chemical apron, chemical resistant coveralls, or chemical resistant coat and pants, along with impervious oil-resistant boots. Remove soaked protective equipment, decontaminate with soapy water, and rinse thoroughly before reuse. Note: product will cause natural rubbers to degrade at a very rapid rate. Such protective equipment will need to be carefully inspected after decontamination to see if it is still in serviceable condition. Any defective or worn out equipment should be immediately discarded.

Respiratory:

No exposure limits are available for this product as a mixture, but appropriate organic vapor or supplied air respiratory protection may be worn if irritation or discomfort is experienced. Where required, respiratory protection must be provided and used in accordance with all local, state, and federal regulations.

Section 9 – Physical and Chemical Properties

Physical State:	Liquid	Color:	Clear to yellow/green tint (<i>May also be colored red – if sold for off road use</i>)
Odor:	Odorless to mild paraffin	Odor Threshold:	No information available
pH:	No information available	Melting/Freezing Point:	No information available
Boiling Point/Range:	150-315° C (300-600° F)	Flash Point:	>39° C (>102° F)
Evaporation Rate:	No information available	Flammability (solid/liq):	No information available
LFL:	0.6%	UFL:	4.7%
Vapor Pressure:	<0.3 mmHg @ 20° C	Vapor Density:	>1
Density:	0.77 g/ml @ 15° C	VOC:	No information available
Solubility (H2O):	Insoluble	Solubility (<i>other</i>):	No information available
Auto Ignition Temp.:	No information available	Decomposition Temp.:	No information available
Viscosity (at 40° C):	1.9 – 4.1 cP	Partition coefficient (n-octanol/water) :	No information available



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Section 10 – Chemical Stability and Reactivity Information

Reactivity:	When handled and stored appropriately, no dangerous reactions are known
Chemical stability:	Stable in closed containers at room temperature under normal storage and handling conditions. Hazardous polymerization will not occur.
Possibility of hazardous reactions:	When handled and stored appropriately, no dangerous reactions are known. If product is heated beyond its flash point, vapors can cause a flash fire. See Sections 5 and 6 regarding spontaneous combustion of product-saturated absorbent materials.
Conditions to avoid:	Ignition sources, accumulation of static electricity, heating product to its flash point, or allowing the product to cool below its melting point (otherwise it may solidify and not be transferable until it is reheated).
Incompatible materials:	Keep away from strong oxidizing agents, strong reducing agents, strong acids, and strong bases.
Hazardous decomposition products:	Carbon monoxides, carbon dioxide, nitrogen oxides, hydrocarbons, water vapor

Section 11 – Toxicological Information

Likely routes of exposure:	Absorption, ingestion, and inhalation
Symptoms	
Inhalation:	Coughing or irritation (vapor, mist, or aerosols)
Eye contact:	Redness or irritation and tearing
Skin contact:	Redness, or irritation
Ingestion:	Nausea, vomiting, or feeling unwell
Acute toxicity	
Oral:	No information available
Dermal:	No information available
Inhalation:	No information available
Skin corrosion / irritation:	No testing was available. However, prolonged or repeated skin contact may irritate the skin and produce dermatitis.
Serious eye damage / eye irritation:	No testing was available. However, oil mist may irritate the eyes.
Sensitization (<i>Respiratory or Skin</i>):	No information available
Germ cell mutagenicity:	No information available
Carcinogenicity:	No information available



Safety Data Sheet (SDS)

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Component carcinogenicity:	No information was available for the listed components of this product. However, IARC, NTP, and NIOSH list diesel exhaust particulates as a possible carcinogen.
Reproductive / developmental toxicity:	No information available
Specific target organ toxicity	No information available
Single exposure:	No information available
Repeated exposure:	No information available
Aspiration hazard:	Due to kinematic viscosity below 5.0 cSt, OSHA regulations state this product may be fatal if it is swallowed and then enters the airways.

Section 12 – Ecological Information

Acute ecotoxicity - short-term exposure

Fish:	No information available
Invertebrates:	No information available
Algae:	No information available
Persistence and degradability:	Biodegradation at >44% (per ASTM D5864-05)
Bioaccumulative potential:	No information available
Mobility in soil:	No information available
Other adverse effects:	No information available

Section 13 – Disposal Considerations

Disposal (<i>waste / unwanted product</i>):	This material, if discarded as produced, would be a RCRA “characteristic” hazardous waste due to the characteristic of ignitability (flash point <140° F). If the material is spilled to soil or water, characteristic testing of the contaminated materials is recommended. Further, this material, once it becomes a waste, is subject to the land disposal restrictions in 40 CFR 268.40 and may require treatment prior to disposal to meet specific standards. Consult federal, state and local regulations to ensure they are followed.
Disposal (<i>containers with residue</i>):	Container contents should be completely used and containers should be emptied prior to discarding. Containers must be disposed in compliance with federal, state, and local regulations. To assure proper disposal of empty containers, consult federal, state and local regulations and disposal authorities.
US EPA Waste number & descriptions:	D001: Waste Flammable material with a flash point <140 °F



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ID: SDS 400-US

Section 14 – Transport Information

UN number: 1202

UN proper shipping name: UN 1202, Diesel fuel, Flammable Liquid, 3, PG III

Transport hazard class: 3 (Flammable Liquids)

Packing group: III

Marine pollutant: ☒ Yes ☐ No

Transport in bulk requirements: 241 (see 49 CFR §173.241)

Special transportation precautions: 144, B1, IB3, T2, TP1 (see 49 CFR §172.102)

Section 15 – Regulatory Information

Inventory Listings

TSCA ☒ Listed ☐ Exempt

DSL ☒ Listed ☐ Exempt

U.S. Federal Regulations

SARA 311/312 Hazard Categories:

Acute Health Hazard ☐ Yes ☒ No

Chronic Health Hazard ☐ Yes ☒ No

Fire Hazard ☒ Yes ☐ No

Sudden Release of Pressure Hazard ☐ Yes ☒ No

Reactive Hazard ☐ Yes ☒ No

Clean Water Act: This product contains chemical(s) regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42):

CERCLA: This material, as supplied, does contain some substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). Although there is a "petroleum exclusion" clause which exempts crude oil (along with fractions of crude oil and products – both finished and intermediate) from the CERCLA 103 reporting requirements, there may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

U.S. State Regulations

California Proposition 65:

☒ **WARNING!** This product may contain some chemicals known to the State of California to cause cancer or reproductive harm:

Fuels, diesel, No 2 (diesel engine exhaust is listed as a possible carcinogen)



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U.S. State Right-to-Know Regulations:

Pennsylvania	US Pennsylvania Worker and Community Right-to-know Law (34 PA. Code Chap. 301-323)
<i>Component</i>	<i>CAS Number</i>
Fuels, diesel, No 2	68476-34-8
New Jersey	US New Jersey Worker and Community Right-to-know Act (New Jersey Statute Annotated Section 34:5A-5)
<i>Component</i>	<i>CAS Number</i>
Fuels, diesel, No 2	68476-34-8

Section 16 – Other Information

Issuing Date: Jan 20, 2014

Revision Date: July 27, 2015

Version #: 20150727

NFPA:

1	Health
2	Flammability
0	Reactivity

Revision Note: Updated Section 16 to reflect correct NFPA diamond information.

WARNING: POTENTIALLY HAZARDOUS MATERIAL. IMPROPER USE OR MISHANDLING CAN RESULT IN SERIOUS INJURY OR DEATH. THIS PRODUCT CONTAINS SUBSTANCES WHICH, IF MODIFIED, MAY BE FLAMABLE AND MAY BURN OR EXPLODE IF HEATED OR EXPOSED TO FLAME OR OTHER IGNITION SOURCE OR WATER, OXIDIZING AGENTS, ACIDS OR OTHER CHEMICALS. AVOID INGESTION, INHALATION AND CONTACT WITH SKIN AND EYES.

Disclaimer:

The information provided on this SDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

Hydrogen, compressed

Safety Data Sheet P-4604

according to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1980 Revision date: 04/28/2015 Supersedes: 01/13/2015

SECTION 1: Product and company identification

1.1. Product identifier

Product form : Substance
 Name : Hydrogen, compressed
 CAS No : 1333-74-0
 Formula : H₂
 Other means of identification : Dihydrogen, parahydrogen, refrigerant gas R702, water gas

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
 39 Old Ridgebury Road
 Danbury, CT 06810-5113 - USA
 T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week — Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887 (collect calls accepted, Contract 17729)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification (GHS-US)

Flam. Gas 1 H220
 Compressed gas H280

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US)



Signal word (GHS-US)

: DANGER

Hazard statements (GHS-US)

: H220 - EXTREMELY FLAMMABLE GAS
 H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
 OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION.
 CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
 CGA-HG08 - BURNS WITH INVISIBLE FLAME.

Precautionary statements (GHS-US)

: P202 - Do not handle until all safety precautions have been read and understood
 P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
 P271+P403 - Use and store only outdoors or in a well-ventilated place.
 P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
 P381 - Eliminate all ignition sources if safe to do so
 CGA-PG05 - Use a back flow preventive device in the piping.
 CGA-PG10 - Use only with equipment rated for cylinder pressure.
 CGA-PG12 - Do not open valve until connected to equipment prepared for use.
 CGA-PG06 - Close valve after each use and when empty.
 CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F).

Hydrogen, compressed

Safety Data Sheet P-4604

according to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1980

Revision date: 04/28/2015

Supersedes: 01/13/2015

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substance

Name	Product identifier	%
Hydrogen, compressed (Main constituent)	(CAS No) 1333-74-0	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- First-aid measures after skin contact : Adverse effects not expected from this product.
- First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately. Get immediate medical attention.
- First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, dry chemical powder, water spray, fog.

5.2. Special hazards arising from the substance or mixture

- Fire hazard : EXTREMELY FLAMMABLE GAS. The hydrogen flame is nearly invisible. Hydrogen has a low ignition energy; escaping hydrogen gas may ignite spontaneously. A fireball forms if the gas cloud ignites immediately after release. Hydrogen forms explosive mixtures with air and oxidizing agents.
- Explosion hazard : EXTREMELY FLAMMABLE GAS. Forms explosive mixtures with air and oxidizing agents.
- Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

- Firefighting instructions : If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.
- Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.
- Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.
- Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

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- Specific methods**
- : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
 - Stop flow of product if safe to do so.
 - Use water spray or fog to knock down fire fumes if possible.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures**
- : **DANGER: EXTREMELY FLAMMABLE GAS.** Forms explosive mixtures with air and oxidizing agents. See section 5. Evacuate personnel to a safe area. Appropriate self-contained breathing apparatus may be required. Approach suspected leak area with caution. Remove all sources of ignition, if safe to do so. Reduce gas with fog or fine water spray. Stop flow of product if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable gas may spread from leak. Before entering the area, especially a confined area, check the atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Precautions for safe handling**
- : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment.
- Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions

- : Store only where temperature will not exceed 125°F (52°C). Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g., NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16.

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Hydrogen, compressed (1333-74-0)

ACGIH	Not established
USA OSHA	Not established

8.2. Exposure controls

- Appropriate engineering controls**: Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. **MECHANICAL (GENERAL): Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting.
- Eye protection**: Wear safety glasses with side shields.
- Respiratory protection**: An air-supplied respirator must be used while working with this product in confined spaces. The respiratory protection used must conform with OSHA rules as specified in 29 CFR 1910.134. Select per OSHA 29 CFR 1910.134 and ANSI Z88.2.
- Thermal hazard protection**: None necessary.
- Other information**: Consider the use of flame resistant anti-static safety clothing. Wear safety shoes while handling containers.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless gas.
Molecular mass	: 2 g/mol
Color	: Colorless.
Odor	: Odorless.
Odor threshold	: No data available
pH	: Not applicable.
Relative evaporation rate (butyl acetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: -259.2 °C (-434.56°F)
Freezing point	: No data available
Boiling point	: -252.76 °C (-422.97°F)
Flash point	: No data available
Critical temperature	: -239.9 °C (-399.82°F)

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Auto-ignition temperature	: 566 °C (1051°F)
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: Not applicable.
Relative vapor density at 20 °C	: No data available
Relative density	: 0.07
Relative gas density	: 0.07
Solubility	: Water: 1.6 mg/l
Log Pow	: Not applicable.
Log Kow	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Explosion limits	: 4 - 77 vol %

9.2. Other information

Gas group	: Compressed gas
Additional information	: BURNS WITH INVISIBLE FLAME.

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Can form explosive mixture with air. May react violently with oxidants.

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

10.5. Incompatible materials

Oxidizing agents. Lithium. Halogens.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: Not classified
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Hydrogen, compressed (1f)1333-74-0

LC50 inhalation rat (ppm)	> 15000 ppm/1h
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Skin corrosion/irritation	: Not classified pH: Not applicable.
Serious eye damage/irritation	: Not classified pH: Not applicable.
Respiratory or skin sensitization	: Not classified
Germ cell mutagenicity	: Not classified
Carcinogenicity	: Not classified
Reproductive toxicity	: Not classified

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Specific target organ toxicity (single exposure) : Not classified
Specific target organ toxicity (repeated exposure) : Not classified
Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

12.2. Persistence and degradability

Hydrogen, compressed (1333-74-0)

Persistence and degradability	No ecological damage caused by this product.
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12.3. Bioaccumulative potential

Hydrogen, compressed (1333-74-0)

BCF fish 1	(no bioaccumulation expected)
Log Pow	Not applicable.
Log Kow	Not applicable.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

Hydrogen, compressed (1333-74-0)

Mobility in soil	No data available.
Ecology - soil	No ecological damage caused by this product.

12.5. Other adverse effects

Effect on ozone layer : None.
Effect on the global warming : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1049 Hydrogen, compressed, 2.1
UN-No.(DOT) : UN1049
Proper Shipping Name (DOT) : Hydrogen, compressed
Transport hazard class(es) (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115
Hazard labels (DOT) : 2.1 - Flammable gas



DOT Special Provisions (49 CFR 172.102) : N89 - When steel UN pressure receptacles are used, only those bearing the "H" mark are authorized.

Additional information

Emergency Response Guide (ERG) Number : 115 (UN1049)
Other information : No supplementary information available.

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Special transport precautions

: Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers:
- Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1049
Proper Shipping Name (IMDG) : HYDROGEN, COMPRESSED
Class (IMDG) : 2 - Gases
MFAG-No : 115

Air transport

UN-No.(IATA) : 1049
Proper Shipping Name (IATA) : Hydrogen, compressed
Class (IATA) : 2
Civil Aeronautics Law : Gases under pressure/Gases flammable under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Hydrogen, compressed (1333-74-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
SARA Section 311/312 Hazard Classes	Sudden release of pressure hazard Fire hazard

All components of this product are listed on the Toxic Substances Control Act (TSCA) inventory.

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA

Hydrogen, compressed (1333-74-0)	
Listed on the Canadian DSL (Domestic Substances List)	

EU-Regulations

Hydrogen, compressed (1333-74-0)	
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)	

15.2.2. National regulations

Hydrogen, compressed (1333-74-0)	
Listed on the AICS (Australian Inventory of Chemical Substances)	
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)	
Listed on the Korean ECL (Existing Chemicals List)	
Listed on NZIoC (New Zealand Inventory of Chemicals)	
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)	

15.3. US State regulations

Hydrogen, compressed(1333-74-0)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental	No

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Toxicity	
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

California Proposition 65 - This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer and/or reproductive toxicity

SECTION 16: Other information

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Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product.

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc., it is the user's obligation to determine the conditions of safe use of the product.

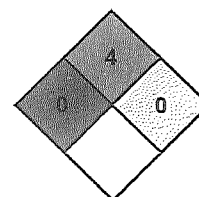
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NFPA health hazard : 0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 0 Minimal Hazard - No significant risk to health

Flammability : 4 Severe Hazard

Physical : 3 Serious Hazard

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